

EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

PUBLICATION NUMBER : 2004317534
PUBLICATION DATE : 11-11-04

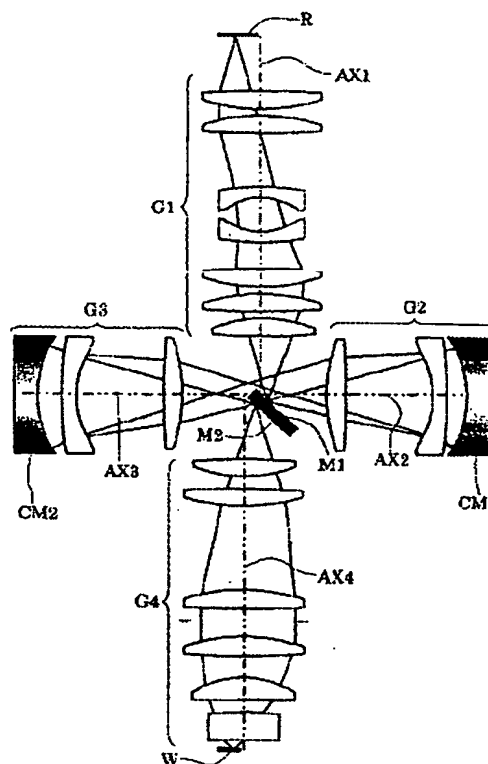
APPLICATION DATE : 11-04-03
APPLICATION NUMBER : 2003107170

APPLICANT : NIKON CORP;

INVENTOR : OMURA YASUHIRO;

INT.CL. : G02B 17/08 G02B 13/14 G02B 13/18
G03F 7/20 H01L 21/027

TITLE : CATADIOPTRIC IMAGE-FORMATION
OPTICAL SYSTEM, EXPOSURE
DEVICE, AND EXPOSURE METHOD



ABSTRACT : PROBLEM TO BE SOLVED: To provide a catadioptric image-formation optical system which has a relatively large numerical aperture in a vacuum ultraviolet-ray wavelength band and is easily optically adjusted and mechanically designed and has various aberrations including chromatic aberration sufficiently compensated and has $\leq 0.1\mu\text{m}$ resolution.

SOLUTION: The catadioptric image-formation optical system forms an image of a first surface (R) on a second surface (W) and is provided with; a first imaging optical system (G1) of refraction type for forming a first intermediate image of the first surface; a second imaging optical system (G2) which includes a concave reflecting mirror (CM1) and forms a second intermediate image on the basis of a luminous flux from the first intermediate image; a third imaging optical system (G3) which includes a concave reflecting mirror (CM2) and forms a third intermediate image on the basis of a luminous flux from the second intermediate image; and a fourth imaging optical system (G4) of refraction type for forming the final image on the second surface on the basis of a luminous flux from the third intermediate image. The imaging optical system has an effective imaging area having a prescribed shape, which doesn't include an optical axis (AX4) of the fourth imaging optical system, on the second surface.

COPYRIGHT: (C)2005,JPO&NCIPI